

Author Query Form

Journal Title : JCR
Article Number : 509056

Dear Author/Editor,

Greetings, and thank you for publishing with SAGE Publications. Your article has been copyedited, and we have a few queries for you. Please address these queries when you send your proof corrections to the production editor. Thank you for your time and effort.

Please assist us by clarifying the following queries:

No.	Query	Remarks
1	Please (a) check that all authors are listed in the proper order; (b) clarify which part of each author's name is his or her surname; and (c) verify that all author names are correctly spelled/punctuated and are presented in a manner consistent with any prior publications.	
2	Considering this as an introduction article, we have not queried for abstract and keywords. Please approve.	
3	“Sagan 1995/1996”has been changed to “Sagan 1996/1997”to match with the reference list. Please approve	
4	Please verify whether the conflicting interest and funding statements are accurate and correct.	
5	Please update reference (a) Fuhrmann and Sechser Forthcoming (b) Kroenig Forthcoming.	
6	Please provide accessed date for reference Ki-moon 2008.	

Nuclear Posture, Nonproliferation Policy, and the Spread of Nuclear Weapons

Journal of Conflict Resolution

00(0) 1-7

© The Author(s) 2013

Reprints and permission:

sagepub.com/journalsPermissions.nav

DOI: 10.1177/0022002713509056

jcr.sagepub.com



AQ 1

Erik Gartzke¹ and Matthew Kroenig²

What is the relationship between nuclear postures and nonproliferation policies and the spread of nuclear weapons? At first blush, this might appear to be an obvious question. After all, states go to great lengths—extending nuclear security guarantees to nonnuclear weapon states, forward-deploying nuclear weapons on the territory of allies, sizing their own nuclear arsenals with the proliferation decisions of other states in mind, supporting international institutions in conducting inspections of nuclear facilities in nonnuclear weapon states, restricting the availability of sensitive nuclear technology, applying and enforcing sanctions against would-be proliferators, conducting military strikes against nuclear facilities, and promoting nuclear cooperation for peaceful purposes, among many other steps—to prevent the spread of nuclear weapons. It would be strange to imagine that states pursue such actions unless they can expect a policy payoff in terms of peace or security. Yet, there is little systematic evidence to suggest that nuclear postures and policies have a meaningful impact on the spread of nuclear weapons.

Correctly understanding the effects of nuclear posture and policy on both horizontal proliferation (the spread of nuclear weapons to new states) and vertical proliferation (increases in the size and sophistication of nuclear arsenals within existing nuclear states) is a subject of extreme real-world importance. United

¹ Department of Political Science, University of California, San Diego, CA, USA

² Department of Government, Georgetown University, Washington, DC, USA

Corresponding Author:

Matthew Kroenig, Department of Government, Georgetown University, 656 IIC 37th & O St NW, Washington, DC 20057, USA.

Email: mhk32@georgetown.edu

AQ 2

Nations Secretary General Ban Ki-moon (2008) has identified weapons of mass destruction (WMD) as “one of the gravest challenges facing international peace and security.” Similarly, in his 2013 annual worldwide threat assessment to the US Congress, US Director of National Intelligence Clapper (2013) observed that nuclear proliferation poses one of the greatest threats to US national security. To respond to this threat, government officials devise policies to prevent the diffusion of the world’s most dangerous weapons. Yet, policy makers have little to guide them in these potentially momentous decisions other than precedent, anecdote, and intuition. Indeed, several senior US government officials have complained to the coeditors of this volume that the academic community has failed policy makers by not conducting the basic research that would inform policy decisions about the costs and benefits of various nuclear policies and postures.

This is not to say that the subject of nuclear proliferation has been overlooked by scholars. Far from it, the causes and consequences of nuclear proliferation have been the subject of a voluminous academic literature. For decades, scholars have carefully examined why countries pursue nuclear weapons (e.g., Sagan 1996/1997) and the effect of nuclear weapons on international conflict (e.g., Schelling 1960). More recently, scholars have examined variation in state nuclear nonproliferation policies (e.g., Kroenig forthcoming) and on how nuclear postures affect nuclear deterrence (e.g., Narang 2010, **in press**; Fuhrmann and Sechser forthcoming). Yet, with few exceptions (e.g., Kroenig 2009a; Fuhrmann 2009b; Solingen 2012), scholars have not examined how the policies adopted by states or international institutions spur or retard the spread of nuclear weapons.

This issue begins to correct this deficit by systematically examining the relationship between nuclear postures and policies and the spread of nuclear weapons. We argue that nuclear postures and policies can exert an important independent effect on horizontal and vertical nuclear proliferation, but that these relationships often also work in unexpected ways. Many of the relationships uncovered in this issue buttress conventional wisdom in policy circles about the determinants of nuclear proliferation. For example, Bleek and Lorber (**in press**) find support for the idea that nuclear security guarantees reduce the incentives for the recipients of such guarantees to develop independent nuclear capabilities. Other findings, however, run strongly counter to intuition. Brown and Kaplow (**in press**), for example, demonstrate how a core activity of the International Atomic Energy Agency (IAEA), the implementation of technical cooperation (TC) programs, actually *increases* the probability of nuclear weapons proliferation.

For most of the authors in this issue, the key dependent variable is the same: horizontal nuclear proliferation. These authors use, or improve upon, the standard set of measures developed in previous research to examine whether states explore, pursue, acquire, or possess nuclear weapons (Singh and Way 2004; Jo and Gartzke 2007). The remaining authors in this issue focus on various determinants of vertical nuclear proliferation. They develop new measures to gauge increases in the size and sophistication of nuclear arsenals in existing nuclear weapon states. In particular,

they collect and analyze new data on delivery vehicles, chemical and biological weapon exploration, pursuit, and possession, and the forward deployment of nuclear weapons. In addition to measures of nuclear posture and policies, the authors in this volume collect new nuclear data that are treated as independent variables, including IAEA TC programs and improved measures of nuclear security guarantees.

The issue can be divided into three sections. The first builds on previous literature exploring the relationship between international nuclear cooperation and the spread of nuclear weapons. Kroenig (2010) and Fuhrmann (2012) argue that sensitive nuclear technology transfers and peaceful nuclear cooperation agreements, respectively, can increase the risk of nuclear proliferation. In their contribution to this volume, Brown and Kaplow (**in press**) point out that nuclear-capable states are not the only sources of nuclear technology for nonnuclear states interested in building the bomb. Brown and Kaplow (**in press**) study the effect of IAEA TC programs on nuclear proliferation. IAEA TC programs help states develop nuclear technology for peaceful purposes, and consistent with Article IV of the Treaty on the Nonproliferation of Nuclear Weapons (NPT), these programs are thought to discourage nuclear proliferation by satisfying state demand for peaceful nuclear technology. Conducting several statistical tests, however, the authors find that the beneficiaries of certain types of TC programs (in particular those related to the development of the nuclear fuel cycle) are at an increased risk of acquiring nuclear weapons. The findings of this research further illuminate the inherent tensions within the NPT and suggest that the IAEA may want to consider altering or scaling back fuel cycle-related TC projects in order to achieve a better balance between its twin mandates of providing nuclear technology while also preventing the spread of nuclear weapons.

The second set of articles evaluates the relationship between nuclear posture and nonproliferation. Bleek and Lorber (**in press**) examine whether the extension of nuclear security guarantees from nuclear-armed patrons dissuades recipient states from pursuing independent nuclear weapons arsenals. As they point out, conclusions from previous research have been mixed, with some scholars finding that states in a defense pact with a nuclear power are less likely to proliferate and others finding no effect. Using improved data and conducting careful forensic analysis of previous research to uncover the reasons for these conflicting results, they report a robust negative relationship between nuclear security guarantees and a nation's likelihood of exploring, pursuing, or acquiring independent nuclear weapons capabilities. This provides empirical support for the conventional wisdom among policy makers, which is that nuclear-armed states may be able to discourage nuclear proliferation by extending nuclear umbrellas.

The second article in this group considers the motivation of nuclear powers in forward-deploying nuclear weapons on the territory of other states. It is often argued that forward deployments contribute to nuclear nonproliferation by increasing the credibility of the nuclear security guarantees discussed by Bleek and Lorber (**in press**) and thereby discouraging host states from building nuclear weapons. Drawing on a new data set of nuclear deployments, Sechser and Fuhrmann (**in press**)

examine whether nuclear powers forward deploy nuclear weapons as an explicit tool of nonproliferation policy or whether these deployments are driven by other considerations. They find that the pattern of forward deployments is not consistent with a nuclear nonproliferation hypothesis. Rather, their results indicate that states forward deploy nuclear weapons to better protect allies as well as to improve the range of their nuclear forces.

The final set of articles considers the sources of vertical proliferation. This is a subject that has not been systematically explored in the scholarly literature, but it is crucial if we are to better understand the spread of nuclear capabilities both across states and within them. Gartzke, Kaplow, and Mehta (*in press*) examine the diversification of nuclear force structure. Why do some countries develop many platforms to deliver nuclear weapons against their opponents, while others develop few? The authors find no support for the idea that the nuclear postures of other states, in particular the diversification of rivals' forces, determine force diversification. Rather, they find that states with greater resources, and with more allies, invest in more diverse force structures, while states that face more severe conventional threats field less diverse forces, presumably because they channel more resources into conventional capabilities.

Finally, Horowitz and Narang (*in press*) explore how a state's nuclear posture affects its broader WMD posture. This article breaks new ground by being the first to systematically examine the determinants of chemical and biological weapons (chem/bio) proliferation. Using a new data set, the authors find that nuclear weapons and chem/bio serve as complements at the pursuit stage, but as substitutes at the possession stage. States in search of nuclear weapons are more likely to pursue chem/bio, but states that possess nuclear weapons are less likely to do so. This supports the folk wisdom among policy makers that chem/bio weapons are a poor man's atomic bomb. States that lack nuclear weapons find the potential strategic benefits of chem/bio attractive, but states that enjoy the significant strategic benefits of nuclear weapons possession lose interest in acquiring chem/bio.

Taken together, the articles in this issue make important contributions to our collective understanding of the diffusion of nuclear weapons. In 2009, the *Journal of Conflict Resolution* published a special issue on the causes and consequences of nuclear proliferation (Gartzke and Kroenig 2009). While nuclear proliferation has long received a substantial amount of scholarly scrutiny (Hymans 2006), the vast majority of previous scholarship on nuclear issues has relied on formal or informal theoretical models or qualitative empirical methodologies, such as case studies (e.g., Powell 1990; Solingen 2007). The 2009 issue broke important new ground by concentrating on the application of statistical techniques and the use of large data samples to better understand why nuclear weapons spread and how proliferation affects world affairs. The studies in the 2009 special issue explained both the causes (Fuhrmann 2009a) and the consequences (Kroenig 2009b) of nuclear technology transfer and highlighted possible motives for proliferation: nuclear nations have more influence (Gartzke and Jo 2009), tend to win crises (Beardsley and Asal

2009), and are less likely to face escalation of disputes (Rauchhaus 2009). And, although new nuclear states experience more conflict, this tendency decays over time (Horowitz 2009).

This issue continues this line of work by bringing together scholars employing quantitative research methods to study a coherent set of nuclear issues. This issue goes beyond existing research, however, in several important ways. First, it studies an underexplored subject area. Previous work identified the supply and demand side factors that increase the risks of proliferation. Researchers found that states above a certain level of industrial capacity, in intense security rivalries, and that were able to get nuclear assistance from more advanced nuclear states, were more likely to acquire nuclear weapons than states that lacked these characteristics (Singh and Way 2004; Gartzke and Jo 2009; Kroenig 2009b; Fuhrmann 2009b). Researchers were not yet ready to examine how, after controlling for these other factors, nuclear postures and nonproliferation policies affect nuclear proliferation, nor were they able to evaluate the determinants of vertical, as opposed to horizontal, proliferation.

Second, and related, this issue presents new and more disaggregated data than had been available previously. Gartzke and Kroenig (2009) measured the nuclear weapons status of states as a dichotomous variable. Regardless of whether nuclear weapons possession was treated as the independent or dependent variable, it was simply coded as 1 or 0. A country either had nuclear weapons or it did not. Many of the most important questions in the field of nuclear studies concern numbers and types of nuclear weapons and variations in nuclear policies. This issue disaggregates nuclear weapons and nonproliferation policies into finer-grained categories and introduces new variables, such as the status and impact of IAEA TC projects, improved measures of nuclear security guarantees, forward deployment of nuclear weapons and their platforms, diversification of nuclear force structure, and the possession of chem/bio. This collection thus begins the complex process of addressing diverse criticisms about applying quantitative methods to proliferation and nuclear security (Montgomery and Sagan 2009; Sagan 2011).

A third, related, issue is that these findings are more directly relevant for policy makers interested in stemming the proliferation of nuclear weapons. While some of the independent variables associated with an increased risk of proliferation identified in previous research, such as nuclear technology transfers, can be manipulated by government officials, other more structural determinants are simply beyond their control. The US Deputy Assistant Secretary of Defense for Countering WMD, for example, cannot meaningfully stunt worldwide economic growth in an attempt to prevent other countries from developing the industrial capacity that would allow them to produce nuclear weapons. He or she can, however, advocate that the United States extend nuclear security guarantees, forward deploy nuclear weapons, maintain a more diversified arsenal of nuclear platforms, or pressure the IAEA to reduce TC programs, each in an effort to retard nuclear proliferation.

Given the important scholarly advances and its obvious policy relevance, we hope this issue receives the widest possible readership. Like all good research,

however, the study of nuclear weapons proliferation is a story that will continue to be written. We have no pretenses that the findings presented here will be the final word on the matter. Indeed, our greatest aspiration is that future scholars, informed and at least partly inspired by the work contained in this issue, will conduct research that further advances our understanding of why the world's most dangerous weapons continue to spread and what we might be able to do to retard, or possibly even reverse, the process of nuclear proliferation.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

AQ4

References

- Beardsley, Kyle, and Victor Asal. 2009. "Winning with the Bomb: The Advantages of Being a Nuclear Power." *Journal of Conflict Resolution* 53 (2): 278-301.
- Bleek, Philipp, and Eric Lorber. **In Press**. "Can Security Assurances Prevent Allied Nuclear Proliferation?"
- Brown, Robert, and Jeffrey Kaplow. **In Press**. "Talking Peace, Making Weapons: IAEA Technical Cooperation and Nuclear Proliferation." *Journal of Conflict Resolution*.
- Clapper, James. 2013. *Statement for the Record on the Worldwide Threat Assessment of the US Intelligence Community for the Senate Select Committee on Intelligence*. Washington, DC: Director of National Intelligence.
- Fuhrmann, Matthew. 2009a. "Taking a Walk on the Supply Side: The Determinants of Civilian Nuclear cooperation." *Journal of Conflict Resolution* 53 (2): 181-208.
- Fuhrmann, Matthew. 2009b. "Spreading Temptation: Proliferation and Peaceful Nuclear Cooperation Agreements." *International Security* 34 (1): 7-41.
- Fuhrmann, Matthew. 2012. *Atomic Assistance: How "Atoms for Peace" Programs Cause Nuclear Insecurity*. Ithaca, NY: Cornell University Press.
- Fuhrmann, Matthew, and Todd S. Sechser. Forthcoming. "Signaling Alliance Commitments: Hand-Tying and Sunk Costs in Extended Nuclear Deterrence." *American Journal of Political Science*.
- Gartzke, Erik, and Dong-joon Jo. 2009. "Bargaining, Nuclear Proliferation, and Interstate Disputes." *Journal of Conflict Resolution* 53 (2): 209-33.
- Gartzke, Erik, Jeffrey Kaplow, and Rupal Mehta. **In Press**. "The Determinants of Nuclear Force Structure." *Journal of Conflict Resolution*.
- Gartzke, Erik, and Matthew Kroenig. 2009. "A Strategic Approach to Nuclear Proliferation." *Journal of Conflict Resolution* 53 (2): 151-60.
- Horowitz, Michael. 2009. "The Spread of Nuclear Weapons and International Conflict: Does Experience Matter?" *Journal of Conflict Resolution* 53 (2): 234-57.

AQ5

- Horowitz, Michael, and Neil Narang. **In Press**. “Are Nuclear, Biological, and Chemical Weapons Substitutes? Comparing the Determinants of WMD Proliferation.”
- Hymans, Jacques. 2006. *The Psychology of Nuclear Proliferation: Identity, Emotions, and Foreign Policy*. Cambridge: Cambridge University Press.
- Jo, Dong-Joon and Erik Gartzke. 2007. “The Determinants of Nuclear Weapons Proliferation.” *Journal of Conflict Resolution* 51 (1): 167-94.
- Ki-moon, Ban. 2008. “The United Nations and Security in a Nuclear-weapon-free world.” Address to the East-West Institute. http://www.un.org/apps/news/infocus/sgspeeches/search_full.asp?statID=351#.
- Kroenig, Matthew. 2009a. “Exporting the Bomb: Why States Provide Sensitive Nuclear Assistance.” *American Political Science Review* 103 (1): 113-33.
- Kroenig, Matthew. 2009b. “Importing the Bomb: Sensitive Nuclear Assistance and Nuclear Proliferation.” *Journal of Conflict Resolution* 53 (2): 161-80.
- Kroenig, Matthew. 2010. *Exporting the Bomb: Technology Transfer and the Spread of Nuclear Weapons*. Ithaca, NY: Cornell University Press.
- Kroenig, Matthew. Forthcoming. “Force or Friendship? Explaining Great Power Nonproliferation Policy.” *Security Studies*.
- Montgomery, Alexander and Scott Sagan. 2009. “The Perils of Predicting Proliferation.” *Journal of Conflict Resolution* 53 (2): 302-28.
- Narang, Vipin. 2010. “Posturing for Peace? Pakistan’s Nuclear Postures and South Asian Stability.” *International Security* 34 (3): 38-78.
- Narang, Vipin. **In Press**. “What Does It Take to Deter? Regional Power Nuclear Postures and International Conflict.” *Journal of Conflict Resolution*.
- Powell, Robert. 1990. *Nuclear Deterrence Theory: The Search for Credibility*. Cambridge: Cambridge University Press
- Rauchhaus, Robert W. 2009. “Evaluating the Nuclear Peace Hypothesis: A Quantitative Approach.” *Journal of Conflict Resolution* 53 (2): 258-77.
- Sagan, Scott. 1996/1997. “Why Do States Build Nuclear Weapons? Three Models in Search of a Bomb.” *International Security* 21 (3): 54-86.
- Sagan, Scott. 2011. “The Causes of Nuclear Proliferation” *Annual Review of Political Science* 14:225-44.
- Schelling, Thomas. 1960. *The Strategy of Conflict*. Cambridge, MA: Harvard University Press.
- Sechser, Todd, and Matthew Fuhrmann. **In Press**. “Nuclear Strategy, Nonproliferation, and the Causes of Foreign Nuclear Deployments.”
- Singh, Sonali and Christopher Way. 2004. “The Correlates of Nuclear Proliferation.” *Journal of Conflict Resolution* 48 (6): 859-85.
- Solingen, Etel. 2007. *Nuclear Logics: Contrasting Paths in East Asia and the Middle East*. Princeton, NJ: Princeton University Press.
- Solingen, Etel. ed. 2012. *Sanctions, Statecraft, and Nuclear Proliferation*. New York: Cambridge University Press.